



International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

<http://gssrr.org/index.php?journal=JournalOfBasicAndApplied>



Emotional Intelligence and Self Concept as Predictors of Students' Academic Achievement in Mathematics

Dr. Daniel Awai^a, Ebimiere Akosubo – Ogori^{b*}

^{a,b}Department of Educational Psychology, Guidance and Counseling, University of Port Harcourt

^aEmail: drawai.daniel@yahoo.com

^bEmail: obimiereako@gmail.com

Abstract

This study investigated Emotional Intelligence and Self Concept as predictors of secondary school students' academic achievement in mathematics in Rivers State. The researcher decided to find out if these emotional intelligence and self concept can predict secondary school students' academic achievement in mathematics in Rivers State. Two (2) research questions and two (2) hypotheses were used in the conduct of this study. The null hypothesis was tested at 0.05 alpha levels. The study was a correlational research. All the secondary school students in Rivers State public schools made up the population of the study. A sample population of 1020 senior secondary two (SS2) students were drawn through multi-stage sampling technique and a sample size of 400 students was used for the study. The instruments used for the data collection was a questionnaire tagged Psychological Assessment Scale (PAS) which was used to elicit information on emotional intelligence, self-concept and Mathematics Academic Achievement Test (MAAT) constructed by the researcher to find out students' achievement. The reliability coefficient score of 0.89 for emotional intelligence, 0.84 for self-concept, and mathematics academic achievement test 0.89 were got using Pearson Product Moment correlation method. Stepwise multiple regression analysis was used for data analysis.

* Corresponding author.

The result obtained after the data analysis indicated that the one null hypothesis was rejected and one was accepted. However, no significant prediction was found between self-concept and academic achievement in mathematics among secondary school students in Rivers State of Nigeria. Sequel to these findings, recommendations were made to improve the achievement of mathematics in senior secondary schools in Rivers State.

Keywords: Emotional Intelligence; Self-Concept; Predictors; Students Academic Achievement; Mathematics.

1. Introduction

Emotional intelligence started its journey in the apparent inability of tradition measures of “rational thinking: (e.g., IQ tests, & AT scores, grades, etc) to predict achievement in life[7] . The search for characteristic other than IQ which adequately explained variations in achievement is by no means new. Social intelligence is defined as, the ability to understand men and women, boys and girls, to act wisely in human relations [11]. In essence, Thorndike defined social intelligence as the ability of an individual to act competently within the realm of social interaction, using ones understanding of the self and others to guide those actions. He said that social intelligence is within the component of universal domain of intelligence. Equally reference [6] developed and explored the concept “multiple intelligences” and found no significant relationship with IQ measures. His notion of personal intelligence narrowed the field of social intelligence to focus on the individuals and the specific abilities needed to facilitate social interactions. He classified personal intelligence into two categories namely:

- Interpersonal intelligence-involves, the ability to understand other people, what motives them, how they work, and how to work cooperatively with them, and
- Intrapersonal intelligence-is the ability to understand oneself and representation of one’s feelings.

It is a capacity to form a veridical model of oneself and to be able to use that model to operate effectively in life [1]. It was these two theories from Thorndike in 1920 and [6] that [14] originated the term emotional intelligence in the United States academic literature. Reference [14] defined emotional intelligence as “the subset of emotional intelligence that involves the ability to monitor one’s own feelings and emotions, to discriminate among them and to use the information to guide one’s feelings and action”. [1] defined emotional intelligence as “a set of key skills, abilities and competences that, unlike traditional intelligence quotient (IQ) which is primarily innate, can be learned by anyone”. He stated that emotional intelligence includes such skills as being able to motivate one, being persistence in facing obstacles and achieve goals, controlling impulses and delaying gratification, controlling one’s moods, thinking rationally, empathizing with others and hoping.

Emotional intelligence as defined by [8], is the ability to identify, understand, use and manage ones and others emotional state effectively. This involves an intellectual process that leads to the use of emotional feelings to motivate, plan and achieve. Emotional intelligence can be used as a term that refers to the ability to recognize, manage and influence one’s and others emotions [9]. Therefore, emotional intelligence can basically be described as an interconnection between feelings and things. Reference [5]felt that emotional intelligence is best understood as a competency. They further described emotional intelligence competency as an individual’s

ability to perceive, understand and use their own emotional status, leading to effective performance. Further studies shows that emotional intelligence plays an important role in the organization direction and motivation of human activities [4].

To clarify the construct of emotional intelligence further to represent cognitive abilities, Mayor and Salovey [10] redefined emotional intelligence as “the ability to perceive emotion, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge and to reflectively regulate emotions so as to promote emotional and intellectual growth”. Not only does this definition more clearly define the construct, it also succeeds in clearing the confusion inherent in the earlier definition and has mapped out a distinct image for the construct of emotional intelligence. Emotional intelligence in practical terms is the application of emotions wisely and the use of those emotions as a moving force for greater achievements. It is the ability to recognize, name and appropriately deal with the emotions that we feel and experience. According to Mayer and Salovey[10], emotional intelligence reflects not a single trait or ability but rather a composite of distinct emotional reasoning, abilities-perceiving, using, understanding and regulating emotions. Perceiving emotions consist of recognizing and interpreting the meaning of various emotional states, as well as their relations to other sensory experiences. Emotional facilitation of thinking (using) describes emotional events that assist intellectual processing and that emotions prioritize thinking in productive ways. Understanding emotions involves comprehension of how basic emotions are blended to form complex emotions, how emotions are affected by events surrounding experiences, and whether various emotional reactions are likely in given social settings. Regulating emotions involves controlling of emotions in oneself and in others .Over the years, performance of secondary school students in both internal and external examinations has been poor. For example, the percentage passes of students who obtained a credit level pass and above (A1-C6) in 2007, showed that, out of 530, 074 candidates, only 36.76% passed, in 2008, out of 1,024,451 candidates only 51.28% passed, and in 2009, out of 1,019,524 candidates, only 43.04% passed. This trend of failure, have continued to increase examination malpractices. These results revealed that the extent of poor academic performance of students in mathematics is serious. It is disturbing that for these years many students did not attain up to the ‘credit level pass’ which is a prerequisite for entry into higher institutions in Nigeria. The situation is even more disturbing when viewed against the nation’s aspiration for scientific and technological advancement and must have compelled [13] to describe poor academic performance in mathematics among secondary school students as a major problem in Nigeria educational system that requires urgent and serious solution. It is in a bid of critically investigating how emotional intelligence and self concept influences the academic achievement of students in mathematics that this study was conceived.

2. Statement of the Problem

The National Policy on Education recommends mathematics as one of the core subjects to be studied at the secondary school level and admission requirement into higher institutions in the country demands a credit level pass in mathematics. But, despite its utilities and importance, mathematics is still been perceived by secondary school students as difficult, boring, abstract, not practicable and believe that achievement in mathematics requires a special ability. Many students therefore develop negative attitude and hatred towards mathematics which result in mathematics phobia. The students become discouraged to the extent that most students who are

considered above average in intellectual ability still find mathematics difficult.

The problem of poor academic achievement will hinder Nigeria's attainment of her educational objectives in the 21st century. Hence, considering the incidence of poor academic achievement in mathematics, the study examined whether emotional intelligence and self concept can predict academic achievement of secondary school students in mathematics.

3. Purpose of the Study

In specific terms, the study sought:

- Whether emotional intelligence can predict secondary school students' academic achievement in mathematics.
- Whether self-concept can predict secondary school students' academic achievement in mathematics.

4. Research Questions

The following research questions guided the study:

- To what extent does emotional intelligence predict secondary school students' academic achievement in mathematics?
- To what extent does self-concept predict secondary school students' academic achievement in mathematics?

5. Hypotheses

The following null hypotheses were tested at 0.05 level of significance

- Emotional intelligence does not significantly predict students' academic achievement in mathematics.
- Self-concept does not significantly predict students' academic achievement in mathematics.

6. Methodology

6.1 Research Design

The design of the study was a correlational study which sought to investigate whether any relationship existed between some psychological parameters and academic achievement in mathematics. This design was considered most suitable for this study because it is used in a situation where the researcher wants to predict one variable from another [12]. This design allows the observation of the extent of relationship of the independent variables (psychological parameters) on dependent variable (academic achievement) of secondary school students in mathematics.

6.2 Population for the Study

The population for the study comprised all senior secondary school students in Rivers State public schools. The number is made up of both male and female students from both the rural and urban areas. The population comprises of 1020 senior secondary school students.

6.3 Sample and Sampling Technique

The study sample was obtained by means of a two-stage probabilistic sampling procedure. In the first stage, 10 secondary schools were selected at random from urban and rural schools so as to ensure even representation. In the second stage, for each school in the sample, students of senior secondary two students (SS2) were chosen at random. The sample was selected by simple random sampling with the size being determined using standard sampling formula based on the population size. The resulting sample size was calculated to be approximately 400 students. The final sample consisted of 400 senior secondary two students. Senior secondary two students (SS2) were chosen because they are matured enough to read, understand and respond to the items of the research instruments appropriately.

6.4 Instrument for Data Collection

Two instruments used for the study include Psychological Assessment Scale (PAS) and Mathematics Academic Achievement Test (MAAT). The Psychological Assessment Scale (PAS) consists of sections A-F. Section A was meant to elicit biographic information from the respondents. Section B contained 15 items used to determine the emotional intelligence of students. The items were adapted from [2]). The Mathematics Academic Achievement Test (MAAT) consists of a 20-item objective questions developed by the researcher based on Government approved Senior Secondary two (SS2) syllabus. It was administered to determine students' level of academic achievement in mathematics.

6.5 Validity of the Instrument

Three experts in the area of measurement and evaluation read through the items of the Psychological Assessment Scale (PAS). The face and content validity of the Mathematics Academic Achievement Test (MAAT) were also done by giving copies of the items to three senior secondary school mathematics teachers familiar with the topics to judge the items. Their suggestions and recommendations were incorporated into the final instrument. The construct validity of each construct of the Psychological Assessment Scale was correlated with the following: Akinboye's EQ test, revised Ray – Lynn Achievement Motivation Scale respectively. The co-efficient of correlation were found to be 0.91 for emotional intelligence, 0.855 for self-concept, 0.87 for achievement motivation.

6.6 Reliability of the Instruments

To ascertain the reliability of the instruments after modifications, there were administered on 100 respondents who were secondary school students (SS2) selected from another five secondary schools which were not part of the study sample using test retest method.

Using Pearson Moment Correlation, the following coefficients were obtained; emotional intelligence 0.89, self-concept 0.84, and mathematics achievement test 0.89. Split half method was used to ascertain the reliability of the PAS and the reliability coefficient yielded 0.82 through Cronbach's Alpha. All the items in the instruments were really very relevant to the content of the study.

6.7 Method of Data Analysis

The data analysis methods used in the analysis of the data collected was multiple regression analysis. This was selected due to the research questions and hypotheses and the size of the sample used. ANOVA and standardized beta values were used for determining the nature of the relationship (positive or negative) between the independent variables of the study (emotional intelligence, self-concept, and attitude towards mathematics, achievement motivation and study habits) and the dependent variable (academic achievement in mathematics). The t-statistics significance (sig) was used as main analysis model for the test of significance of the relationship between independent and dependent variables.

7. Results

Table 1: Coefficients

		Unstandardized Coefficients		Standardized Coefficient	R		Correlation		
Model		B	Std error	Beta	t	Sig.	Zero order	Partial	Part
1	Constant	27.107	.934		29.029	.00			
	Ach Mot	1.590	.23	.635	25.977	.00	.635	.635	.635
2	Constant	12.374	1.156		10.704	.00			
	Ach Mot	.514	.020	.553	25.399	.00			
	El	.381	.021	.390	17.916	.00			
3	Constant	9.674	1.289		7.504	.00			
	Ach Mot	.379	.034	.420	11.578	.00			
	El	.161	.035	.387	17.962	.00			
				.164	4.553	.00			
4	Constant	8.835	1.324		6.674	.00			
	Ach Mot	.1300	.048	.322	6.236	.00			
	El	.380	.021	.388	18.061	.00			
	Study habit	.138	.036	.141	3.809	.00			
	attitude	.123	.047	.130	2.643	.00			

a. Dependent variable: MAT

Result on table 1 showed that each of the independent variables that entered into the equation made a significant contribution to the prediction of students' academic achievement in mathematics. Specifically, achievement motivation made the most significant contribution (Beta = 0.553, $t=25.399$, $p<0.05$) to the prediction of academic achievement in mathematics. This was followed by emotional intelligence (Beta = 0.390, $t=17.916$,

$p < 0.05$); study habit ($\text{Beta} = .164$, $t = 4.553$, $p < 0.05$) and lastly, self-concept did not enter into the equation and therefore was insignificant.

In the table of variables entered and removed, emotional intelligence was added to the regression equation in model 2. The increase in R^2 as a result of including this variable was 14.5% (table 1) which was statistically significantly, $F(2, 996) = 606.189$, $p < 0.05$. This means that emotional intelligence significantly predict students' academic achievement in mathematics.

From table 1, the beta value of 0.390, $p < 0.05$ was one of the most important predictor of students' academic achievement in mathematics. This implies that the null hypothesis of no significant linear predictor of student's academic achievement on their emotional intelligence is rejected. That is, there is an overwhelming statistical evidence of linear relationship between emotional intelligence and academic achievement in mathematics among secondary school students' in Rivers State. Thus the higher the students' emotional intelligence, the greater their achievement in mathematics.

In the table of variable entered and removed, self-concept was not added into the regression equation. This was because it did not significantly predict secondary school students' academic achievement in mathematics. Therefore, the null hypothesis of no significant linear prediction of students' academic achievement on their self-concept is accepted.

8. Summary

The result of the study showed that emotional intelligence can predict students' academic achievement in mathematics. Also, the study revealed that self concept does not have significant relationship with academic achievement in mathematics. By implication, it means that self concept cannot predict students' academic achievement in mathematics.

9. Conclusion

The finding of the study has indicated that emotional intelligence plays a significance role in the academic achievement of students in mathematics. Therefore, the issue of being emotionally intelligence will be addressed in order to produce better and quality students in the Nigerian society.

10. Recommendations

Based on the findings or results of the study, the following recommendations were stated;

- The need to introduce programs of emotional literacy in mathematics education with the aim of promoting a change in attitude, self-concept, motivation and emotions towards mathematics and mathematics learning.
- The development of self-concept and achievement motivation is a function of perceptions of influential others such as parents and role models (Teachers). These influential figures can let students know that

they are perceived to have the skill, capabilities and temperament necessary for achieving academically.

- There is a need to foment collaboration between counselling psychologist (school counselors) and mathematics teachers in the affective domain field, given its influence on the quality of school-level learning. This will require the establishment of projects and programs of prevention and intervention in difficulties of mathematics learning and achievement. The aim will be to stimulate the attraction and taste for mathematics and to improve the psychological parameters and the emotional reactions that students experience when they are learning mathematics. This program will surely reduce the academic fear of mathematics bothering on phobia.
- Teachers should develop positive relationships with students and stress classroom activities, which will improve active teaching – learning process and students’ participation in class so that students will benefit maximally from instruction.
- Rivers State Government and ministry of education in particular should give urgent attention in the area of teacher education in mathematics by arranging workshops, seminars and refresher courses for practicing mathematics teachers on regular basis. This will help them learn new and current method of teaching mathematics which will improve academic achievement in mathematics.

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